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## ***Farmers As Consumers: Making Choices***

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I am the dirt farmer here at the meeting—operating on the lowest rung of the biotech ladder! As operators of a farm in northwest Iowa, my brother and I use the products of biotechnology and try to make them commercially viable. We have one employee, so three of us make a living from about 4,000 acres of corn and soybeans. We grow seed beans for three seed companies, all genetically altered. And we grow tofu beans that are exported directly to Japan. We have commodity corn and waxy corn for salad dressing and mayonnaise, corn for juvenile poultry, and we also grow pharmaceutical corn.

We have been planting *Bt* corn and Roundup Ready® soybeans for the last 3 or 4 years. About 80% of the soybeans this year, and some people say more, in this country will be genetically altered. Approximately 25% of the corn will also be genetically altered in this country. This is the most rapidly adopted technology that has ever come to agriculture, including steam power, electricity, commercial fertilizer, and hybrid corn. None of those innovations were adapted as fast as biotechnology.

### **MORE TIME FOR WHAT MATTERS**

With Roundup Ready® beans we have a \$12/acre savings right from the start, which, in today's agricultural economy, is very important to the family farmer. When I was growing up, I spent my summers walking soybean fields with a garden hoe, cutting out the weeds that were competing for nutrients and moisture. Because of biotechnology and Roundup Ready® soy, my children are involved in Little League baseball and the swim team, and attend dance lessons, *etc.* And, as a parent, because of Roundup Ready® beans, I get to watch them. As a user at the ground level, biotechnology gives me time, the most precious commodity that any of us can find today. It helps me be a better husband and a better father, and that is important to me.

## **BIOTECH AND ZERO TILLAGE**

Of course, it is environmentally friendly. Roundup is a contact herbicide. It does not function in the soil, so it doesn't get into the ground water, unlike other crop-protection products that have been available for the past 15 to 20 years. The Roundup Ready® technology also allows us to no-till drill our soybeans directly into the stubble of the previous crop. No-till crop production has been around for 20 years; but it worked well for only 2 or 3 years before the weed pattern would shift and give problems. With Roundup Ready® soybeans, continuous no-till is possible. It is the technology that will be written about 500 years from now. From the first time that a human being took a stick, put a hole in the ground and planted a seed and became the first farmer thousands of years ago, farming has always been connected with soil erosion. In Europe where they have been farming for three or four millennia, soil erosion is a very serious problem. In this country, we have lost half of our topsoil in the past 150 years. When historians write about this period 500 years from now, it will not be about Bill Clinton or George Bush or Saddam Hussein, it will be about how biotechnology allowed us to go to no-till and *stop* soil erosion—stop the deterioration of the food factory of the earth.

## **GPS AND TRACEABILITY**

Today's tractors and combines use global positioning system (GPS) technology. The steering of the tractor is controlled via microprocessors such that when it gets to the end of the field I have to turn it around and relocate the line and it then takes off on its own, planting perfectly straight rows in any direction and any heading that you wish to log in the computer. This will be part of the traceability system. With GPS equipment on board we record what the seed is—the genetics come with that information—we document the longitude and latitude of where that seed is planted and when it is planted. The information is time-stamped and eventually will be available to everybody in the value chain for traceability efforts. The average farm tractor and the average combine that is harvesting crops have more computing power in the cab than the rockets we sent to the moon and back.

## **BT CORN AND TIME AVAILABLE FOR HARVEST**

The leaves of *Bt* corn plants are toxic to the larvae of European corn borer, which is great, because this insect is the most serious pest for corn. On the other hand, in the real world where I live that is not the chief benefit. To me the longer harvest window—because of improved late-season plant health—is very critical. If my harvesting goes from a 2-week period to a 4-week period, it means that I can use the same \$200,000 combine on twice as many acres or I can use a smaller combine on the acres I have today. That has a greater financial benefit effect for me than anything else the *Bt* technology brings. It is critical for farmers everywhere. And of course, again, the technology is

environmentally friendly. When we used to spray fields that had corn borer in them, we killed all the insects. Now the plant itself is the herbicide, and it is specific to only that insect pest, and beneficial insects are not harmed in any way.

### **REVITALIZED RURAL COMMUNITIES**

In 2001, we were among the first to grow, under contract, corn that synthesizes a pharmaceutical for the treatment of cystic fibrosis patients; we grew it again in 2002 for phase-3 clinical trials in Europe. This is going to be a very important part of rural development and rural revitalization. Biotechnology eventually is going to take a lot of the plywood down off the small towns in the corn belt. It will take us from a low-margin mature-commodity business to a higher-margin management-responsive new business to allow farmers to generate some real dollars. Accordingly, we are trying to set up a technology-support program in Iowa. In our little group, we have written our SOPs for experimental transgenic crop production. We are also growing some tobacco that is genetically altered to not have nicotine, and in 2002 we will grow some safflower crops from Canada that in 2003 will produce another human pharmaceutical.

Thus, biotechnology is opening the door of opportunity for development of family farms in rural communities. And this technology, as it expands and grows in the corn belt, will not bring traditional unskilled, low paying jobs. Instead it will draw degreed people back into the rural states. It will change the flavor of Minnesota, Iowa and other states that grow traditional commodity crops.

About 450 drugs are in the pipeline. We are involved with the first one, but many more will follow in the next 24 to 48 months. We are excited about this, as are lots of other farmers. In Iowa we are taking a three-part platform to try to draw industry back into the corn belt. Almost all of the tech companies tell us that it makes sense to produce these biotech pharmaceutical and industrial enzyme crops in the corn belt, especially in areas with low hail rates (hail is the #1 weather problem for these crops). Corn is the domesticated crop of choice for drug production, and we think that we can enhance the potential of traditional corn-growing areas. Novecta is a certification program for producers, put in place by the Iowa and Illinois Corn Growers Associations. Through self-funding and our check-off money, we have devoted \$600,000 to develop web-based coursework for farmers to become qualified in technologies to reduce risks for biotech providers in producing these crops. Written exams will be involved, and farmers who obtain certification will receive a card saying that they are certified producers of a particular industrial enzyme or pharmaceutical who understand the technology, the SOPs, and critical aspects of containment. One of the reasons that we got the contract to grow pharmaceutical corn is that we convinced the company that we had a 100% identity-preservation system. Because of Starlink™, that is the number-one issue. We found that our

traditional commodity system was totally inappropriate for these high-value crops, therefore, we have dedicated planting machinery, dedicated husbandry, dedicated harvesting equipment, dedicated transportation and storage equipment so that our pharmaceutical production gets nowhere near our commodity corn. Our SOPs are written around that.

The idea of a technician program came from a community college in Iowa that is working with an animal pharmaceutical company to set up a curriculum to train technicians for animal-vaccine production in that company. We have been working with Iowa State University, the community college system and the University of Iowa to put together a program that will train 2-year technicians on one hand through to advanced biochemists on the other end of the spectrum such that they all understand their place in the chain, why they do what they do and why it is important. Iowa is the only state that has a parallel-constructed curriculum.

And lastly, the third leg is a multi-tenant biologics facility. A \$20-million facility is under construction at the Research Park in Ames, Iowa. Companies will take their table-top test-tube work, which they can replicate in the lab, to this facility and lease a suite for the time required to commercialize the product. This facility will be large enough to run one tenth of a commercial batch to see if it is scalable:

- Do they have the right equipment, the right process, to scale, and if they do, what does it cost? How much time does it take?
- What percentage of product do they get?

All such issues can be figured out at this facility, which is the only one of its kind in the world. This is Iowa's approach to this situation.

### THE REASON FOR THIS CONFERENCE

A letter was sent to my brother and me by a mother who has two sick children, after she saw an article written about us:

*My step-dad subscribes to Top Producer and forwarded the January 2002 issue to me. My son Justin, age 13, and daughter Candice, age 8, have cystic fibrosis. We were thrilled to see your involvement in the fight against cystic fibrosis and other diseases. Thank you for your dedication thus far. I'm sure it hasn't been easy. Justin wrote a book, enclosed, when he was 8 years old to explain to his friends why he couldn't do some of the things that they could do. The title is 99 Bottles of Pills on the Wall and it's illustrated by Justin. He wants you to have a copy because of your help with this disease. Justin prays about this disease. Thank you for being available for His purposes. God bless you.*

Jennifer Colson

This is the reason for this conference. Agricultural biotechnology is where the rubber meets the road.